

B. Claims

Please cancel claims 1, 21 and 68-71 and amend claims 2, 3, 5, 7, 9-17, 20, 22-26 and 28-30 as follows. A complete listing of all the claims appears below; this listing replaces all earlier amendments and listings of the claims.

1. (Cancelled)

2. (Currently Amended) A head substrate according to claim 1, of a printing head detachably mounted on a printer main body comprising:

plural external connection terminals individually receiving, from the exterior, a binary logic signal corresponding to whether or not to execute a recording operation, a recording image signal and a clock signal;

recording execution means for executing the recording operation according to the recording image signal and the clock signal entered through said external connection terminals, in case the binary logic signal is in a first state;

data memory means for executing a memory access which is at least either of data writing and data readout; and

memory access means for recognizing the binary logic signal as an access permission signal and executing the memory access to said data memory means in case the logic signal is in a second state;

wherein said external connection terminals include:

first common terminal wiring means for supplying the externally entered binary logic signal to said memory access means and to said recording execution means; and

second common terminal wiring means for supplying the externally entered clock signal as a recording clock signal to said recording execution means and as a memory clock signal to said memory access means.

3. (Currently Amended) ~~A~~ The head substrate according to claim 2, wherein: said recording execution means is adapted for executing the recording operation based on the recording image signal serially entered into one of said external connection terminals; and

said common terminal wiring means allows at least one of the input of data into said memory access means and the output of data from said memory access means, using the same external connection terminal that serially inputs the recording image signal.

4. (Cancelled)

5. (Currently Amended) ~~A~~ The head substrate according to claim 2, wherein: said recording execution means is adapted for executing the recording operation based on the recording image signal parallel entered into plurality of said external connection terminals; and

said common terminal wiring means allows at least one of the parallel input of data into said memory access means and the parallel output of data from said memory

access means, using the same external connection terminal that inputs, in parallel, the recording image signal.

6. (Cancelled)

7. (Currently Amended) ~~A~~ The head substrate according to claim 2, wherein: said recording execution means includes a shift register which is reset by a reset signal externally entered into one of said external connection terminals and is adapted to temporarily hold and parallel output, at a timing corresponding to the clock signal, the recording image signal serially entered into another of said external connection terminals; and

 said common terminal wiring means is adapted for supplying said memory access means with the reset signal for the shift register, as the binary logic signal constituting the access permission signal.

8. (Cancelled)

9. (Currently Amended) ~~A~~ The head substrate according to claim 2, wherein: said recording execution means includes a shift register which is adapted to be reset by a reset signal externally entered into one of said external connection terminals and then to temporarily hold and parallel output, at a timing corresponding to the clock signal, the recording image signal serially entered into another of said external connection terminals, and a latch circuit which is adapted to be reset by the reset signal and then to

temporarily hold and output the recording image signal parallel outputted from the shift register; and

said common terminal wiring means is adapted for supplying said memory access means with the reset signal as the binary logic signal constituting the access permission signal.

10. (Currently Amended) ~~A~~ The head substrate according to claim 2, wherein: said recording execution means includes a shift register which is adapted to be reset by a reset signal externally entered into one of said external connection terminals and then to temporarily hold and parallel output, at a timing corresponding to the clock signal, the recording image signal serially entered into another of said external connection terminals, and a latch circuit which is adapted to temporarily hold and output the recording image signal parallel outputted from the shift register at a timing corresponding to a latch signal externally entered into still another of said external connection terminals; and

said common terminal wiring means is adapted for supplying said memory access means with the latch signal as the binary logic signal constituting the access permission signal.

11. (Currently Amended) ~~A~~ The head substrate according to claim ~~12~~, wherein said recording execution means includes plural recording elements for recording the recording image signal parallel outputted from the latch circuit, corresponding to a recording pulse signal externally entered into one of said external connection terminals.

12. (Currently Amended) ~~A~~ The head substrate according to claim 11,
wherein the recording element is a heat generating element.

13. (Currently Amended) ~~A~~ The head substrate according to claim 2,
wherein said common terminal wiring means is adapted to supply said memory access
means with the clock signal for the recording image signal, as a memory clock signal.

14. (Currently Amended) ~~A~~ The head substrate according to claim 2,
wherein: said data memory means executes both data writing and data readout as the
memory access;

 said memory access means selectively executes either of data writing into
 and data readout from said data memory means corresponding to an externally entered
 mode switching signal; and

 said common terminal wiring means supplies said memory access means
 with the input signal to one of said external connection terminals as the mode switching
 signal.

15. (Currently Amended) ~~A~~ The head substrate according to claim 2,
wherein: said recording execution means is adapted for receiving a driving electric power
externally entered from one of said external connection terminals; and

 said common terminal wiring means is adapted for supplying said memory
 access means with the driving electric power for said recording execution means.

16. (Currently Amended) A The head substrate according to claim 2,
wherein said external connection terminals, said recording execution means, said data
memory means, said memory access means and said common terminal wiring means are
constituted by films formed on one base substrate.

17. (Currently Amended) A printing head detachably mounted on a printer
main body; comprising a head substrate according to claim †2.

18. - 19. (Cancelled)

20. (Currently Amended) A The printing head according to claim 17,
wherein the execution means includes heat recording elements for discharging ink.

21. (Cancelled)

22. (Currently Amended) A printing head according to claim 21; detachably
mounted on a printer main body comprising:
plural external connection terminals individually receiving, from the
exterior, a binary logic signal corresponding to whether or not to execute a recording
operation, a recording image signal and a clock signal;
recording execution means for executing the recording operation according
to the recording image signal and the clock signal entered through said external connection
terminals, in case the binary logic signal is in a first state;

data memory means for executing a memory access which is at least either
of data writing and data readout; and
memory access means for recognizing the binary logic signal as an access
permission signal and executing the memory access to said data memory means in case the
logic signal is in a second state;

wherein said external connection terminals include:

first common terminal wiring means for supplying the externally entered
binary logic signal to said memory access means and to said recording execution means;
and

second common terminal wiring means for supplying the externally entered
clock signal as a recording clock signal to said recording execution means and as a memory
clock signal to said memory access means.

23. (Currently Amended) A printing apparatus comprising:
a printing head according to claim 17; detachably mounted on a printer main
body comprising a head substrate comprising
plural external connection terminals individually receiving, from the
exterior, a binary logic signal corresponding to whether or not to execute a recording
operation, a recording image signal and a clock signal;
recording execution means for executing the recording operation
according to the recording image signal and the clock signal entered through said external
connection terminals, in case the binary logic signal is in a first state;

data memory means for executing a memory access which is at least either of data writing and data readout; and

memory access means for recognizing the binary logic signal as an access permission signal and executing the memory access to said data memory means in case the logic signal is in a second state;

input means for individually transmitting the binary logic signal of the first state and various signals such as the recording image signal and the clock signal respectively to plurality of said external connection terminals of said printing head, causing said recording execution means to execute a recording operation; and

access control means for transmitting the binary logic signal of the second state and the clock signal to said plural external connection terminals of said printing head, causing said memory access means to execute the memory access.

24. (Currently Amended) A printing apparatus comprising:

a printing head according to claim 21 detachably mounted on a printer main body comprising:

plural external connection terminals individually receiving, from the exterior, a binary logic signal corresponding to whether or not to execute a recording operation, a recording image signal and a clock signal;

recording execution means for executing the recording operation according to the recording image signal and the clock signal entered through said external connection terminals, in case the binary logic signal is in a first state;

data memory means for executing a memory access which is at least either of data writing and data readout; and

memory access means for recognizing the binary logical signal as an access permission signal and executing the memory access to said data memory means in case the logical signal is in a second state;

input means for individually transmitting the binary logic signal of the first state and various signals such as the recording image signal and the clock signal respectively to said plurality of external connection terminals of said printing head, causing said recording execution means to execute a recording operation; and

access control means for transmitting the binary logic signal of the second state and the clock signal to said plural external connection terminals of said printing head, causing said memory access means to execute the memory access.

25. (Currently Amended) A The printing apparatus according to claim 23, wherein: said input means is adapted for serial transmission of the recording image signal to a specified one of said external connection terminals; and

 said access control means is adapted for serial transmission of the writing data for said memory access means to one of said external connection terminals in which the recording image signal is serially entered.

26. (Currently Amended) A The printing apparatus according to claim 23, wherein: said input means is adapted for parallel transmission of the recording image signal to a specified plurality of said external connection terminals; and

said access control means is adapted for parallel transmission of the writing data for said memory access means to said plurality of external connection terminals in which the recording image signal is parallel entered.

27. (Cancelled)

28. (Currently Amended) ~~A~~ The printing apparatus according to claim 23, wherein the recording is executed by discharging ink by the heat of a heat generating element.

29. (Currently Amended) ~~A~~ The printing apparatus according to claim 24, wherein said recording execution means includes a heat generating element for recording.

30. (Currently Amended) ~~A~~ The printing apparatus according to claim 29, wherein the recording is executed by discharging ink by the heat of the heat generating element.

31. - 71. (Cancelled)